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TICO MINES PTY LTD

Report

on

Exploration on SPL 762

Balfour, Tasmania

January - June, 1977

AMG REFERENCE POINTS ADDED

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A. INTRODUCTION.

This Report covers the activities of Tico Mines prospecting party during the first half of 1977. The party was based at Balfour and was supported from Burnie.

The area prospected is within SPL 762 (J.D. Ware) at Balfour on the West Coast.

In the initial stage, activities were centred on establishment and ground survey. Other activities planned for the season i.e. drilling of 12" O holes to bedrock for systematic gravel sampling and the digging of costeans on the mud flats have been postponed due to interference by The Department of the Enviroment which called a halt to all exploration work until further notice. That order also applied to exploration work within the mining leases on which the company had the right to explore on behalf of the owner Laan, Langsford, Abouav and Ware.

MAJOR ACTIVITIES.

1. Survey of Lease.
2. Pegging of proposed drilling sites.
3. Hand sampling of soil at creeks and old alluvial workings.
4. Camp restoration.
5. Comparisons of findings with previous reports.
6. Enviromental impact study including restoration plan.
7. Cleaning up of debris left by tourists every weekend, and provision of rubbish bins in the main tourist attraction areas.
8. Transporting of self driven auger to site and removal of same.

At this stage it is proposed that following the granting of permit by The Department of the Enviroment (which presumably is still studying our impact on the enviroment i.e. the disappearance of empty beer cans, the appearance of rubbish bins, and the protection of wild life which now doesn't get shot at nearly as much due to our presence in the area), drilling may commence. With this in mind the auger (again) and a Tracked FEL Backhoe are being transported to the site. It is not anticipated that drilling will commence until after the rainy season as transportation of rig on site will cause great damage to both the enviroment and plant.

B. LOCATION AND ACCESS.

SPL 762 (100 km²) is situated in the Balfour area with Mt. Frankland on its south eastern corner. The old township of Balfour is situated approximately 50 air km SSW of Smithton. It is 18 km from the coast on the northern end of the West Coast of Tasmania. The townsite is approximately central to the area.

Access is via a very rough four wheel drive track from Temma (Whales Head) and from Smithton by light aircraft. A good all weather air strip suitable for single engine aircraft is situated 2 km west of Balfour on high ground.

Movement in the SPL is on rough vehicle roads formed by previous exploration. Much of the area is covered by button grass swamps. Movement during the rainy season is very difficult and at times impossible even on the main track to Temma.

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LOCALITY PLAN



AMG REFERENCE POINTS ADDED

C. PREVIOUS MINING ACTIVITY.

Most of the known, worked mineral occurrences are covered by existing ML's. Alluvial cassiterite has been worked along Tin Creek, from Specimen Hill to its junction with the Frankland River 4 km north. Extensive alluvial workings occur on, and around the base of Specimen Hill. Production was officially recorded as about 300 tonnes in the period 1907 to 1942. Since most of the alluvial working occurred prior to 1907, total production may be of the order of 800 tonnes of concentrates.

Extensive workings for copper occur immediately SW of Balfour at Murrays Reward Mine. Massive pyrite - covellite - chalcocite ores were mined. Total production to 1912 was about 400 tonnes of copper; workings extended about 100m depth. Rich secondary ore was also extracted from the Central Mount Balfour Mine immediately east of Balfour. Production was "some hundred tons of rich ore" (Ward 1910). The workings extend 60m depth.

The available Mines Department records of tin production are listed below:

1907	45		5,094
1908	3		280
1909	3		278
1910	nil		---
1911	"		---
1912	"	116.9	---
1913	29.15		3,873
1914	30.5		3,074
1915	4.5		506
1916	26.93		3,310
1917	6.98		1,132
1918	11.71		2,535
1919	6.25		1,526
1920	---	2.52	675
1921	---	0.60	103
1922	---	2.41	364
1923	---	1.00	202
1929	---	1.22	243
1930	---	0.88	121
1931	---	0.30	32
1942	---	0.044	11

D. TITLES.

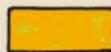
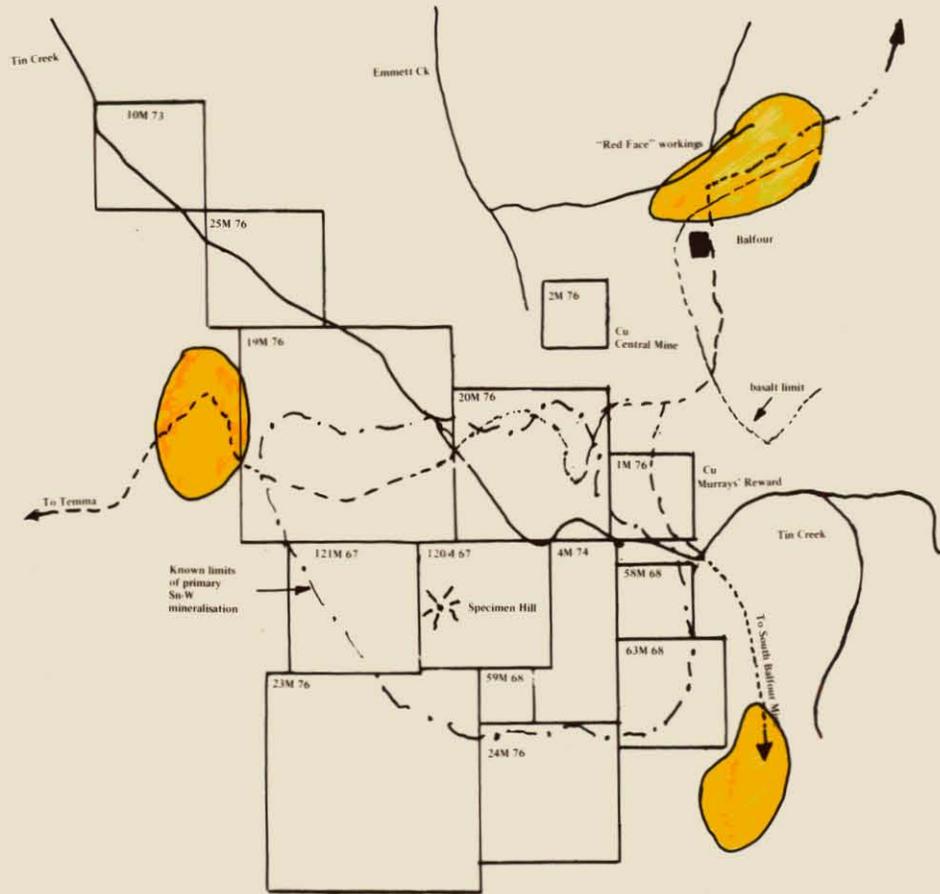
SPL 762 is held by J.D. Ware, it is surrounded by EL 1/77 (CRA Expl. Pty. Ltd.) and surrounds a number of mineral leases immediately west of the townsite of Balfour as listed below.

120 M 67	
121 M 67	
10 M 73	M. Laan
1 M 76	N. Langsford
2 M 76	
20 M 76	P. Laan
58 M 68	E.J. Bayley
63 M 68	E.J. Bayley
59 M 68	
4 M 74	J.H. Halloway
19 M 76	M. Laan and 3 others
23 M 76	
24 M 76	M. Laan and 3 others
25 M 76	

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LOCATION OF MINERAL LEASES AND KNOWN MINERALISATION NEAR BALFOUR.

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areas suggested for further exploration

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E. EXPLORATION REPORT by N.R. Langsford.

1. INTRODUCTION

SPL 762 (100 km²) encloses most of the known mineralisation of the Balfour Mining Field, County Russell. It is surrounded by EL 1/77 (CRA Expl. Pty. Ltd.) and surrounds a number of mineral leases immediately west of the townsite of Balfour.

Tin and wolfram mineralisation has been discovered in the Specimen Hill area, west of Balfour, and copper mineralisation has been discovered and explored along a NNW trending zone. Significant amounts of alluvial cassiterite and oxidised copper ores have been produced, mainly prior to 1914.

2. KNOWN MINERALISATION TYPES

(i) Tin - Wolfram

Known tin and tungsten mineralisation is essentially confined to an area around Specimen Hill. Alluvial workings, dating from 1884 have exposed, as the source of tin, numerous, generally thin, randomly-oriented, quartz - cassiterite veins. Thicknesses range from 1cm to 0.5m. At surface, the veins consist of quartz with minor cassiterite and wolfram. At depth the veins contain also pyrite, chalcopyrite and arsenopyrite e.g. a vein cored in DDBI 14% cassiterite, 1% wolfram, 1% chalpyrite and 25% arsenopyrite, whereas at surface on the W face of Specimen Hill, the same quartz vein contains only cassiterite and wolfram, with cavities showing leaching of sulphides. Mica (Muscovite) selvages to the veins are generally 5mm wide.

The cassiterite and wolfram generally occur as 2mm crystals on the margins of the small veins, and as large 1cm blebs within the thicker veins. These veins, in themselves, are unlikely to prove economic unless concentrated to form a stock-work, but nowhere is this concentration of veins and veinlets known to occur.

(ii) More massive sulphide-free, quartz-cassiterite veins occur at several places on Specimen Hill. These contain up to 70% cassiterite.

(iii) Fine-grained cassiterite is also known to occur within altered, green laminated shale at several places on Specimen Hill. This cassiterite occurs at small 0.5mm black crystals. This type of mineralisation is hard to detect away from obvious quartz veining.

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(iv) Massive fine-grained cassiterite occurs with crystalline pyrite and greisen on ML 56/68, 100m. west of Murrays Reward Mine. The cassiterite forms masses up to 25kg. in a matrix of soft cream-coloured, mica-rich clay (weathered greisen?), and finely admixed with coarse pyrite on veinlets in altered talcose shales surrounding the mica-rich zone. Though small and irregular, the tin ore-body is rich and has produced several tonnes of concentrates from a pit, 3m. in length, 1m. wide, and 2m. deep. The surface expression of this ore was a narrow 1cm. quartz-pyrite-cassiterite vein. Shales adjacent to this vein contain 210 p.p.m. tin.

(v) A massive arsenopyrite-quartz-pyrrhotite-wolframite vein occurs in ML 4M/74. The vein occurs in altered laminated siltstones. A sample of the banded sulphides assayed 1.1% wolfram and 0.33% tin. Silicified shales hosting the vein contained 110 p.p.m. wolfram and 450 p.p.m. tin.

(vi) Copper

Copper mineralisation was first noted in 1901, and interest in the field peaked in 1908. At the Murrays Reward Mine, most production took place from the oxidised zone. Ore consisted mainly of quartz-pyrite-covellite, with chalcocite. Only rich ore could be worked due to lack of work ore treatment and transport facilities. Ore was hand-picked to 20-30%. In the lower levels, primary quartz-pyrite-chalcopyrite ore of much lower grade was mined. This ranged from 3-6%. Considerable amounts of this ore ("seconds") is on the dumps and packed in the upper stopes of the mine.

The ore body was considered by Ward (1910) as a "fissure lode" along a major structural zone trending approximately NNW through the Balfour field.

Quartz and iron-rich dolomite are the major gangue minerals, though the latter is only recognised in mine working or diamond drill holes, as it weathers readily.

Considerable exploratory work was done, prior to 1910, on two other copper prospects within the SPL. These are the Central Mount Balfour Mine and Balfour Blocks Copper Mine. Shaft sinking at these prospects proved the existence of primary quartz-pyrite-chalcopyrite ore below a leached zone.

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3. SUMMARY OF PREVIOUS EXPLORATIONS

(i) General

Within comparatively recent times the Balfour field has been investigated by BHP (1962-64) and ACI Explorations, the former concentrating on the search for tin, the latter, copper.

ACI drilled over 40 diamond drill holes along the line of copper mineralisation within the SPL, carried out underground sampling and surface mapping, costeaning, I.P. work and rock chip sampling.

(ii) Geochemistry

BHP carried out a geochemical sampling survey over Specimen Hill and environs, on a 2 chain grid. As expected this showed anomalous values about the old elluvial workings. However, more recent work has shown that this survey did not detect some significant quartz-cassiterite on Specimen Hill. Thus for locating small scale vein mineralisation a closer grid spacing may be required.

No "gravel" samples were analysed for tungsten so the application of this loaming method for locating wolfram mineralisation is not known.

Apart from concentrations of the order of 1-10% tin in massive quartz veins, BHP's drilling and costean sampling showed tin values of 100-1100 p.p.m. in laminated shales. Background is recorded as 100 p.p.m. (NB 100 p.p.m. is considered highly anomalous in hard rock tin exploration).

(iii) Copper

ACI's diamond drilling programme was concentrated around known copper occurrences and seemingly based on targets defined by conventional I.P. surveys. The occurrence of abundant disseminated pyrite and carbonaceous shales makes this procedure of dubious value.

Significant copper mineralisation was found only on the Murrays Reward - Central Mine area. The pyrite and chalcopyrite occur in thin veins and bands with a quartz-dolomite horizon; this is similar to the ore occurrences described from the lower workings in Murrays Reward by Ward (1910) and Moore (1912).

The drilling outlined a zone of copper mineralisation about 250m long, 200m down dip and 4m true width. Average grade is about 0.8%.

The quartz-dolomite-pyrite-chalcopyrite body appears to be discordant with the enclosing chloritic and carbonaceous shales. McIntire (1972) suggests "that the mineralisation is associated with a transverse fault which formed a favourable depositional site for dolomite, quartz, iron and copper sulphides which were mobilised and transported from the primary Murrays Reward cupriferous formations during or after faulting".

4. VEGETATION AND TOPOGRAPHY OF SPL 762

The highest peaks on the SPL are Mount Balfour (405m) and Mt Frankland (426m). Both are formed by massive quartzites. The western part of the SPL forms part of the coastal peneplain which is bounded to the east by the valley of Tin Creek and Mt Balfour. The coastal peneplain is cut by numerous creeks flowing west and is characterised by a layer of peat which obscures most of the bed-rock.

The north-eastern part of the SPL is covered by the valley of Frankland River, and it's associated belts of forest. This area is virtually impenetrable and could only be explored with great difficulty.

The south-eastern portion is occupied by the valley of Tin Creek and the slopes of Mt Frankland. Apart from minor belts of timber, this area is quite often open and accessible.

Most of the SPL is covered by a layer of peat (0.1-1m.) dark in colour, supporting button grass, heath and minor scrubby eucalypts and tea-tree. The peat is underlain by 0.1-2m. of quartzite detritus. This is the most resistant and accumulates over all rock types.

A small area around Balfour townsite is covered by a heavy clay soil derived from the weathering of a tertiary basalt. The soil supports a heavy growth of bracken fern and secondary forest.

5. GEOLOGY

The dominant rock type exposed in SPL 762 is a thick sequence of laminated siltstones and slates, sandstones and quartzites.

The siltstones and slates are usually finely laminated, graded bedding and cross-bedding occur. Small-scale, slump structures are common. In places the slates are carbonaceous. Near Specimen Hill, green laminae are due to the presence of fine-grained tourmaline.

Massive green chloritic shales occur in Emmet Creek near Balfour.

Quartzites and sandstones form interbeds with the shales and siltstones, ranging in thickness from 20m. to 10cms. They are generally fine-grained massive pale-coloured rocks. On Mt Frankland conglomeritic units occur, stained red by minor fine-grained hematite.

These units, given the informal name "Balfour Slates and Sandstones" by Ward (1910) are generally supposed to be Upper Precambrian. The presence of suspected worm burrows suggests that the upper part of the series may be Lower Cambrian.

The general strike of these beds is north-south, with an easterly dip. Many minor folds occur, notably at Specimen Hill and 5 km west of the Blocks Mine; producing local variations of dip and strike, local faulting has been noted but its regional importance is not yet clear.

Most previous workers e.g. Ward (1910), Chestnut (1964) have suggested the presence, at depth, of granite rocks to account for tin-wolfram mineralisation. The nearest outcrop is 25 kms. distant at Sandy Cape, this Devonian granite is associated with minor tin-wolfram mineralisation.

No acid igneous rocks are known to occur on SPL 762. The association of the postulated granite to the mineralisation remains an enigma.

A small patch of tertiary basalt occurs at Balfour townsite, and a similar remnant at the Clump, near the northern boundary of the SPL.

6. GEOPHYSICAL INVESTIGATIONS

(a) Magnetic Surveys

A survey in 1950 by Rio Tinto (Aust) indicated a series of anomalies trending approximately north-south passing through Specimen Hill. This was confirmed by a series of lines flown by SMR for BHP. This showed as the main feature SPL 762, a broad NNW - NW trending high about 250 - 400 gamma above background.

Detailed magnetic surveys by BHP (Taylor 1965) outlined the anomaly on the ground. The anomaly strikes about NNW, is about 3.5 km long and up to 0.5 km wide. Maximum relief is about 500 gamma.

The cause of the anomaly is not known. None of the material intersected in six holes drilled by BHP is sufficiently magnetic to cause the anomaly. One possible explanation is that the anomaly is due to massive pyrrhodite mineralisation.

(b) Induced Polarization Surveys

Extensive surveys were carried out for ACI by McPhar Geophysics along the line of copper mineralisation. Many anomalies located were due to carbonaceous shales and disseminated pyrite which are common in that area.

A few IP lines were read across the magnetic anomaly in the Specimen Hill area. These showed strong anomalies especially in the northern part.

(c) Gravity Surveys

BHP read gravity values on Specimen Hill. The pattern of result seems to have no significance in determining geological structure.

7. FUTURE EXPLORATION ON SPL 762

(1) Alluvial Tin

Reconnaissance sampling has shown the presence of alluvial cassiterite outside the area held under Mineral Leases. These areas are south of ML 63m/68 along the road to the South Balfour Mine, past the Tin Creek bridge, and west of ML 19m/76 along the western bank of Matrix Creek. The extent and grade of these alluvial and elluvial deposits should be determined by pitting.

Other areas where alluvial cassiterite may occur in worthwhile quantities are (i) north of Specimen Hill along the valley of Tin Creek, (ii) in the valley of Emmett's Creek immediately north of Balfour townsite. In the latter area very old workings have exposed tin-bearing gravels beneath the basalt capping.

Both the above areas should be briefly examined to assess their potential; in fact investigation of these alluvial occurrences may lead to the discovery of primary tin-tungsten mineralisation.

(2) Primary Tin and Tungsten

(a) Veins

At present, the known occurrences of primary tin and tungsten mineralisation are confined to an area around Specimen Hill. Existing ML's cover most of this area. Occurrences of quartz-cassiterite veins, such as that known to occur in the above area, could be located by (i) sampling of heavy mineral fraction of stream sediment, (ii) systematic pitting and sampling of heavy mineral concentrates from gravels and bedrock from pits.

Initial sampling should be north and south of Specimen Hill, covering the aeromagnetic anomaly. This may locate a concentration of veins (stockwork) or a zone of fine-grained cassiterite disseminated in slate/shale.

(b) Cassiterite - Sulphide Deposits

Three important cassiterite-pyrrhotite deposits occur in NW Tasmania - Mt Bischoff, Mt Cleveland and Renison Bell. In each of these places the major bodies are fine-grained cassiterite in pyrrhotite. They are not obviously associated with acid igneous rocks.

It is impossible that the magnetic anomaly in SPL 762 is caused by such a pyrrhotite body. Certainly the magnetic anomaly is associated with a strong geochemical tin anomaly, with abundant vein mineralisation carrying tin, the anomalous tin is shales and slates (110-1100 p.p.m.).

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Diamond drilling has shown minor disseminated pyrrhotite, and in one hole BD6, immediately north of Specimen Hill, slates with abundant pyrrhotite contain 0.2-0.3% tin over three metres. No massive sulphides bearing tin have been intersected.

The northern part of the anomaly is intense and narrow, and possibly the source of the anomaly may have some surface expression. A detailed examination of this area should be carried out, with a systematic sampling of any outcrops in the area. If a sulphide body drops out, the surface expression would be a gossanous formation containing fine-grained cassiterites.

8. RECOMMENDATIONS

1. Completion of regional mapping of area.
2. Completion of detailed mapping of the area around Specimen Hill, where tin, wolfram and copper mineralisation occur.
3. Sampling of gravels and bedrock in areas north and south of Specimen Hill on a 250m. grid.
4. Examination of area covered by areomagnetic anomaly north of Specimen Hill and chip sampling where necessary.

9. REFERENCES

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